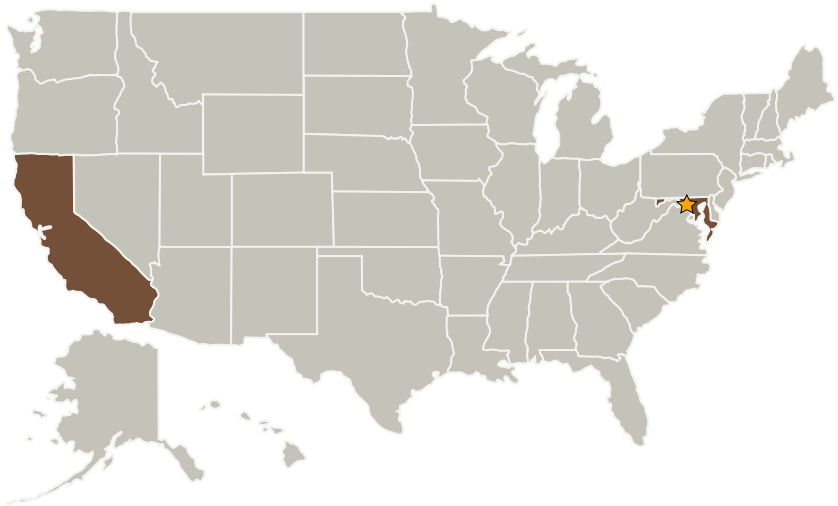
In Situ Microradiometers: Smaller, Faster, and Scalable to Hyperspectral, Phase II

Completed Technology Project (2005 - 2007)

Project Introduction

Radiometers are a crucial element in NASA's studies of Planet Earth. This proposal addresses the basic need for a miniature light sensor, flexibly configurable and optimized for above and in-water optical property measurements. The innovation we are proposing develops a 1 cm diameter photodetector module, called a "microradiometer." The microradiometer consists of a photodetector, preamplifier with controllable gain, high resolution analog to digital converter (ADC), microprocessor, and an addressable digital port, all on one small, thin circuit assembly. We anticipate that the design will result in significant improvements in dynamic range, sampling speed, reliability, and reduced power consumption over existing instruments. In a Phase II embodiment, a single microradiometer forms the basis of a very small (much less than 2.5 cm diameter) single-channel submersible light sensor that can be deployed in support of coastal research opportunities. In another application, clusters of microradiometers can be matched with front end optics (collector/window/filter stack) to form small, fast, less expensive multiwavelength radiometers for a variety of measurements ? even hyperspectral applications. We call this configuration the Modular Microradiometer System (MMS). These MMS systems can be packaged into small underwater housings suitable for deployment on drifters, moorings, towed vehicles, and vertical profilers.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
Biospherical Instruments, Inc.	Supporting Organization	Industry	San Diego, California

Primary U.S. Work Locations	
California	Maryland

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX14 Thermal Management Systems
  - TX14.2 Thermal Control Components and Systems
    - TX14.2.8 Measurement and Control